

## Abstract

**Human hand biomanipulator optimalization for patients with varying degrees of amputation prosthetic purposes.**

Upper limb injuries variety makes it significantly difficult to design a universal and compact prosthetic hand with functionality similar to human limb. One of the solutions to this problem is the use of a modular prosthetic system in which individual prosthesis modules are composed according to the individual needs of each patient. To make an useful upper limb prosthetic solutions it is necessary to take into account the high risk of prosthesis damage during everyday use. Modern developed systems enable service of individual modules with a simplified production process. Presented in this work solutions for optimization makes it possible to reduce final user costs while improving the technical patient support. Developed as part of the doctoral thesis author's, innovative, modular prosthetic solution is the result of an real medical need. Currently available commercial prosthetic systems or solutions are not fulfilling all the modern users expectations . A comprehensive research approach presented in the following document allowed to develop a unique solutions for human upper limb prosthesis and had been tested by patients with different levels of amputation. Clinical trial confirm that the developed solution are able to restore a large portion of the upper limb functionality and where implemented to upper limb trauma medicine. Based on the data, design assumptions and technical description the modular prosthetic system is taking into account many of the users needs escribed in the scientific papers and direct patient statements. All of the technical project assumption where made baser on the clinical data and where transformed in the wide design parameters set as a guide line for future prosthetic solutions development. All the presented solution whare and still are being tested in every day conditions by real life users.

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